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(54) **ARTIFICIAL NAIL OR TIP ARRANGEMENT AND METHOD OF MAKING SAME**

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**Related U.S. Application Data**

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(51) **Int. Cl.**

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<i>B32B 9/00</i>	(2006.01)
<i>B32B 33/00</i>	(2006.01)
<i>B29C 65/00</i>	(2006.01)

(52) **U.S. Cl.**

USPC ..... **132/73**; 428/41.7; 428/41.8; 156/285

(58) **Field of Classification Search**

USPC ..... 132/73, 200, 73.5, 285, 317, 319, 320, 132/333; 428/40.1, 41.7, 41.8, 42.2, 42.3, 428/43, 15; 156/61, 212, 242, 245, 246, 156/247, 250, 285, 289, 257, 259; 604/389, 604/390, 344; 602/57, 58

See application file for complete search history.

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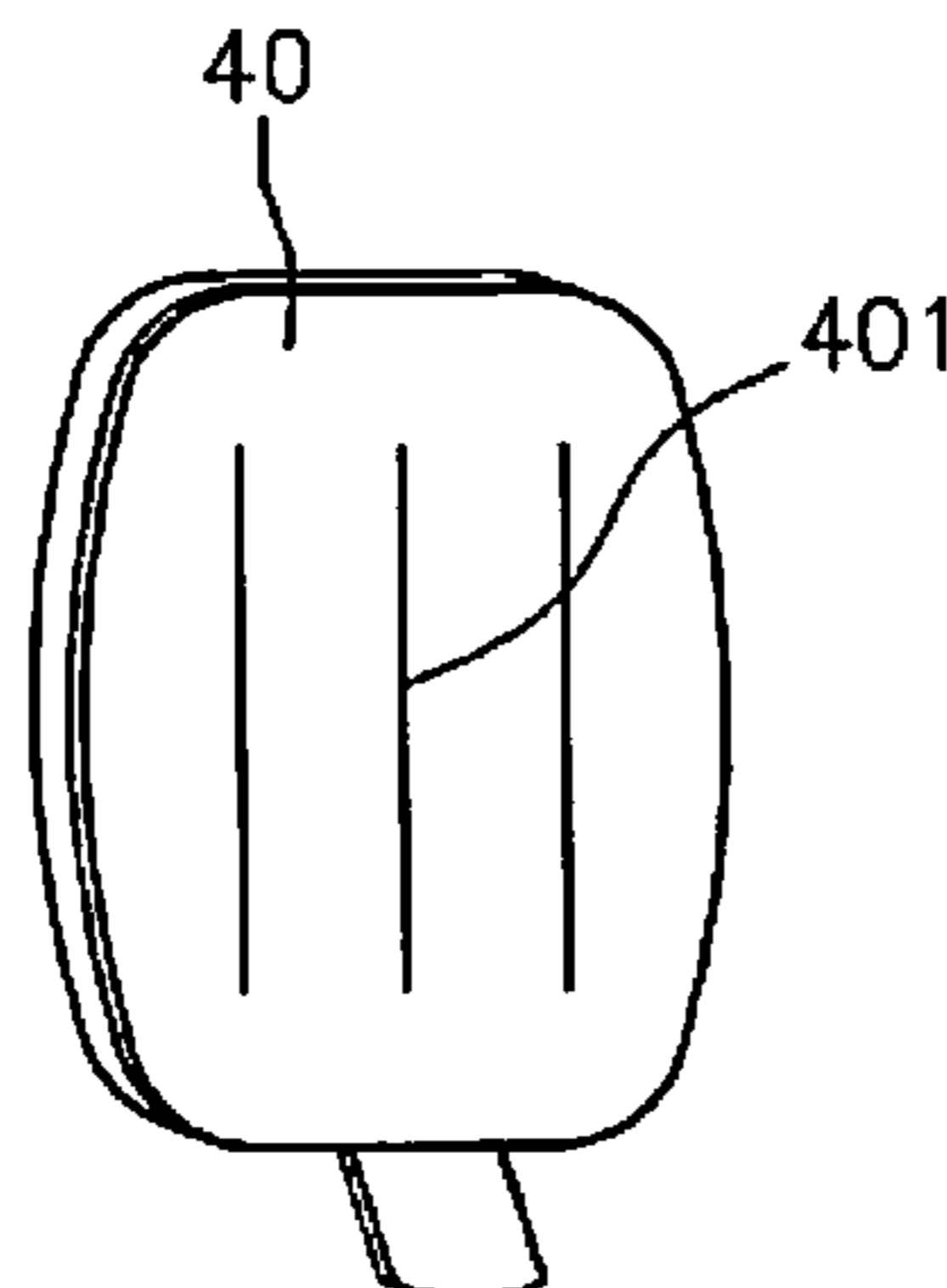
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(57) **ABSTRACT**

An artificial nail or tip arrangement and method of making the same are provided. The arrangement includes a body having a concave lower surface with a shape corresponding to a natural nail. The arrangement also includes an adhesive layer having a first surface and an opposing second surface. The first surface adheres to the concave lower surface of the body and the second surface is provided to adhere to the natural nail when applied thereto. The arrangement further includes a removable layer that covers the second surface of the adhesive layer, and which is removable to expose the second surface of the adhesive layer for application to the natural nail. The removable layer is provided with a plurality of slits so that a surface of the removable layer remains smooth after adherence of the first surface of the adhesive layer with the concave lower surface of the body.

**5 Claims, 6 Drawing Sheets**



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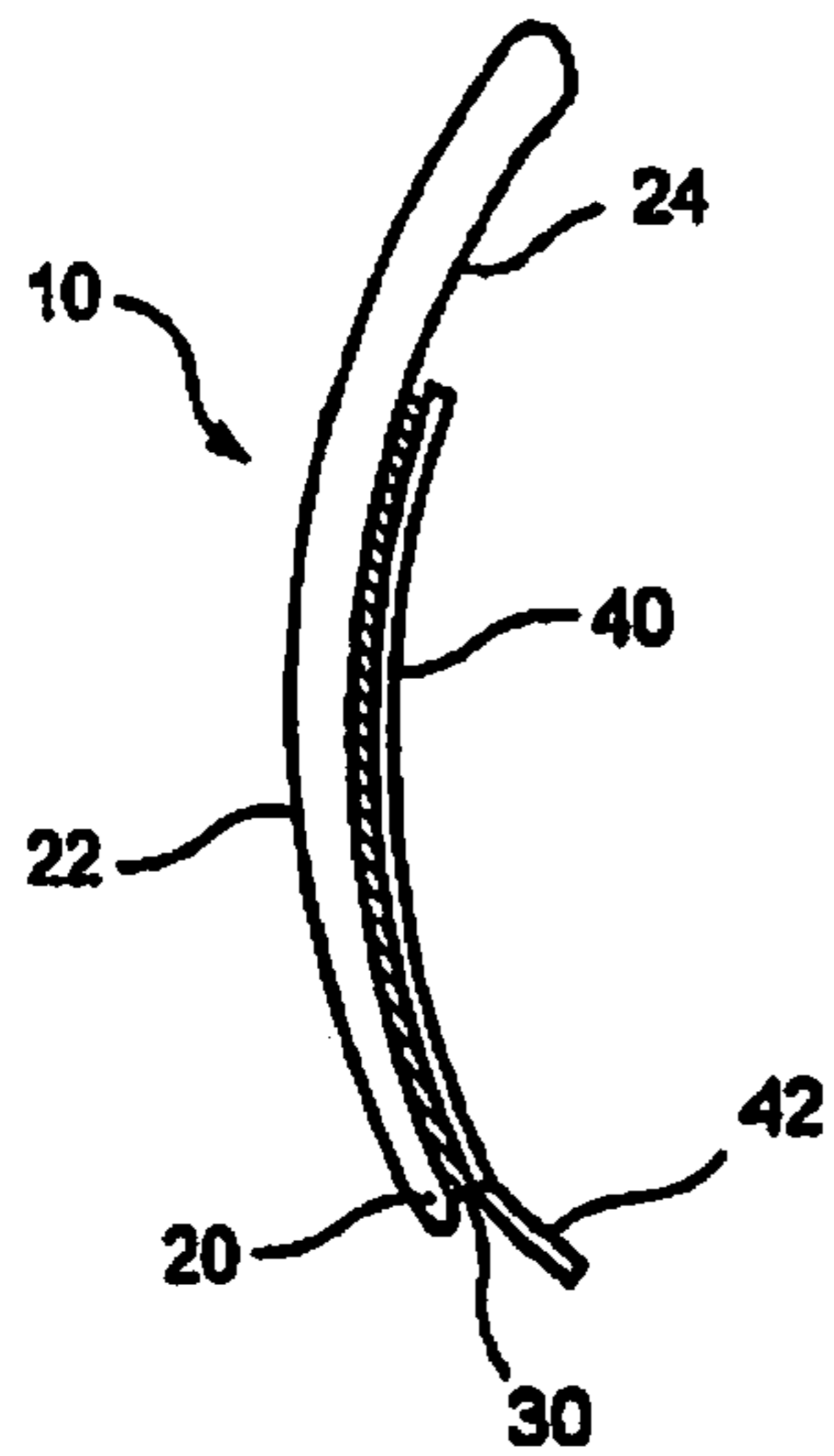


FIG. 1

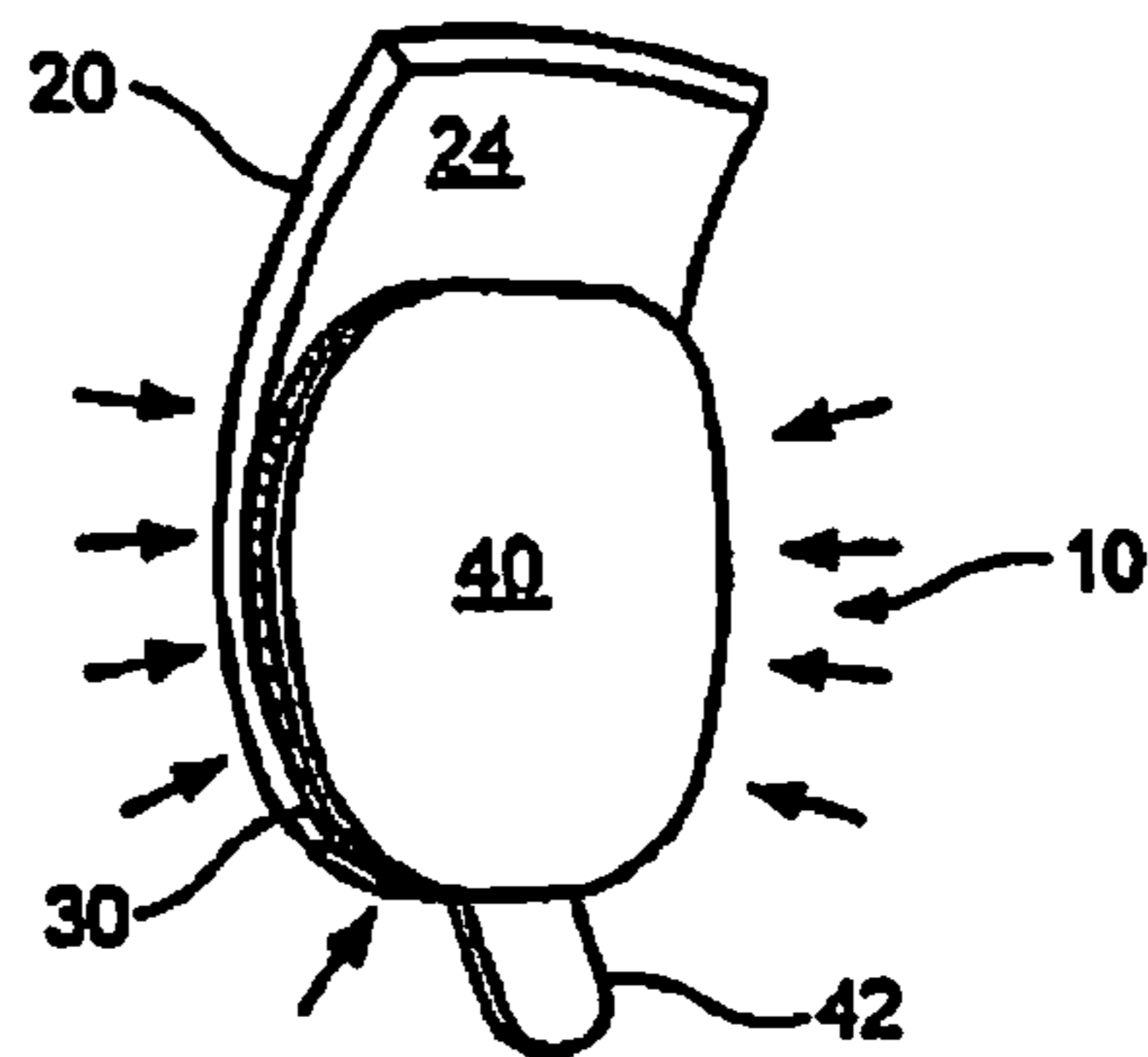


FIG. 2

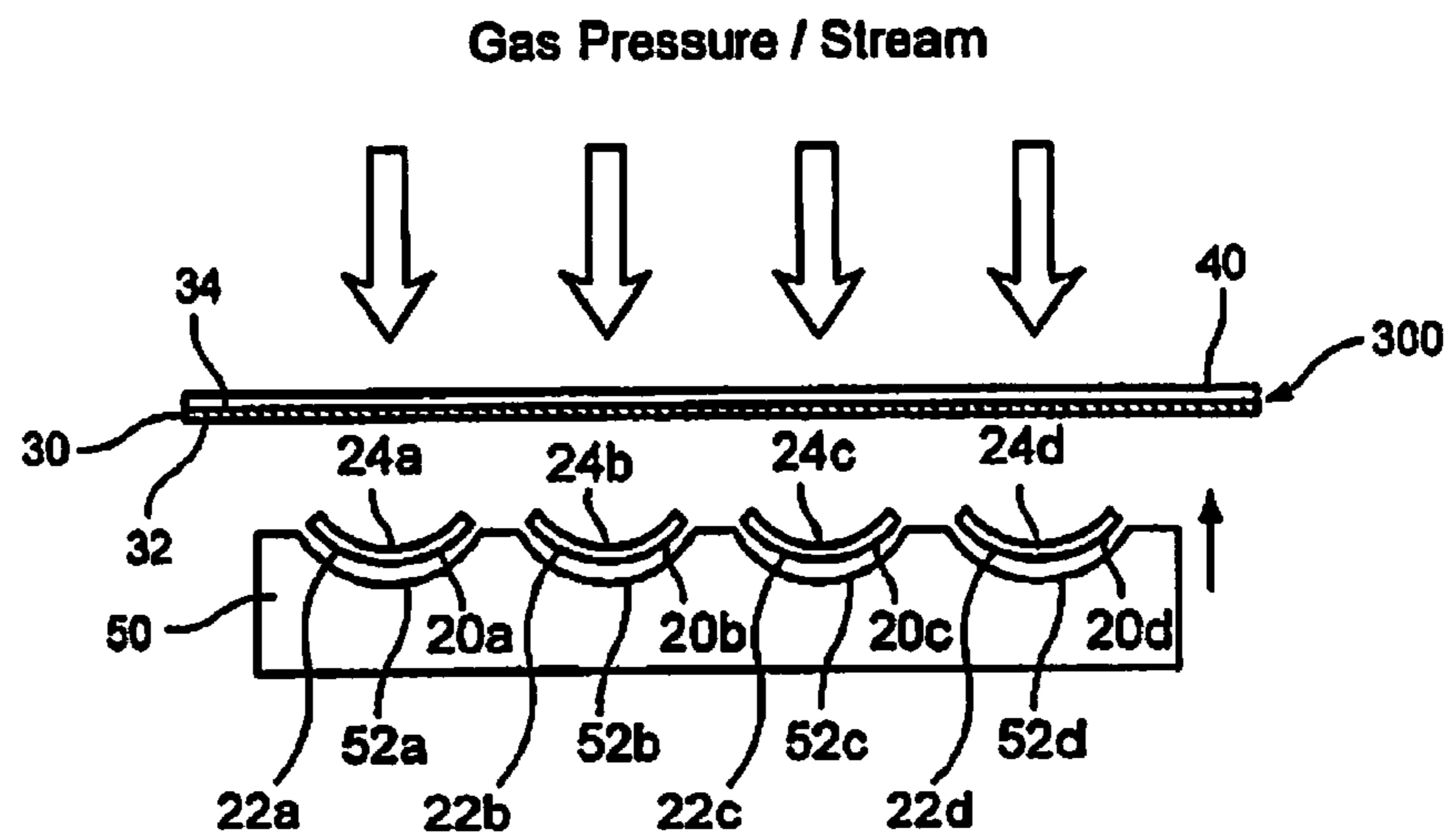


FIG. 3

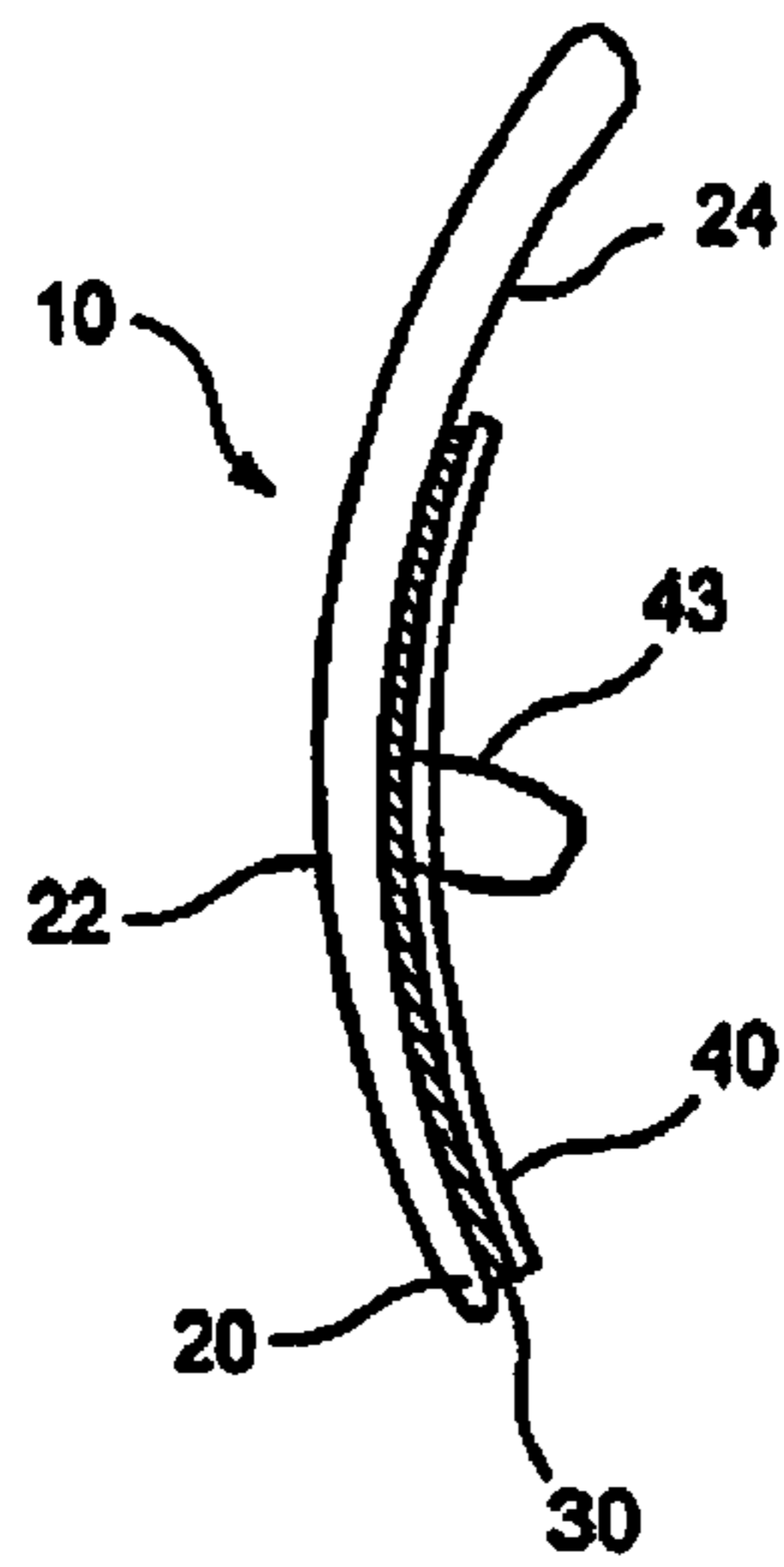


FIG. 4

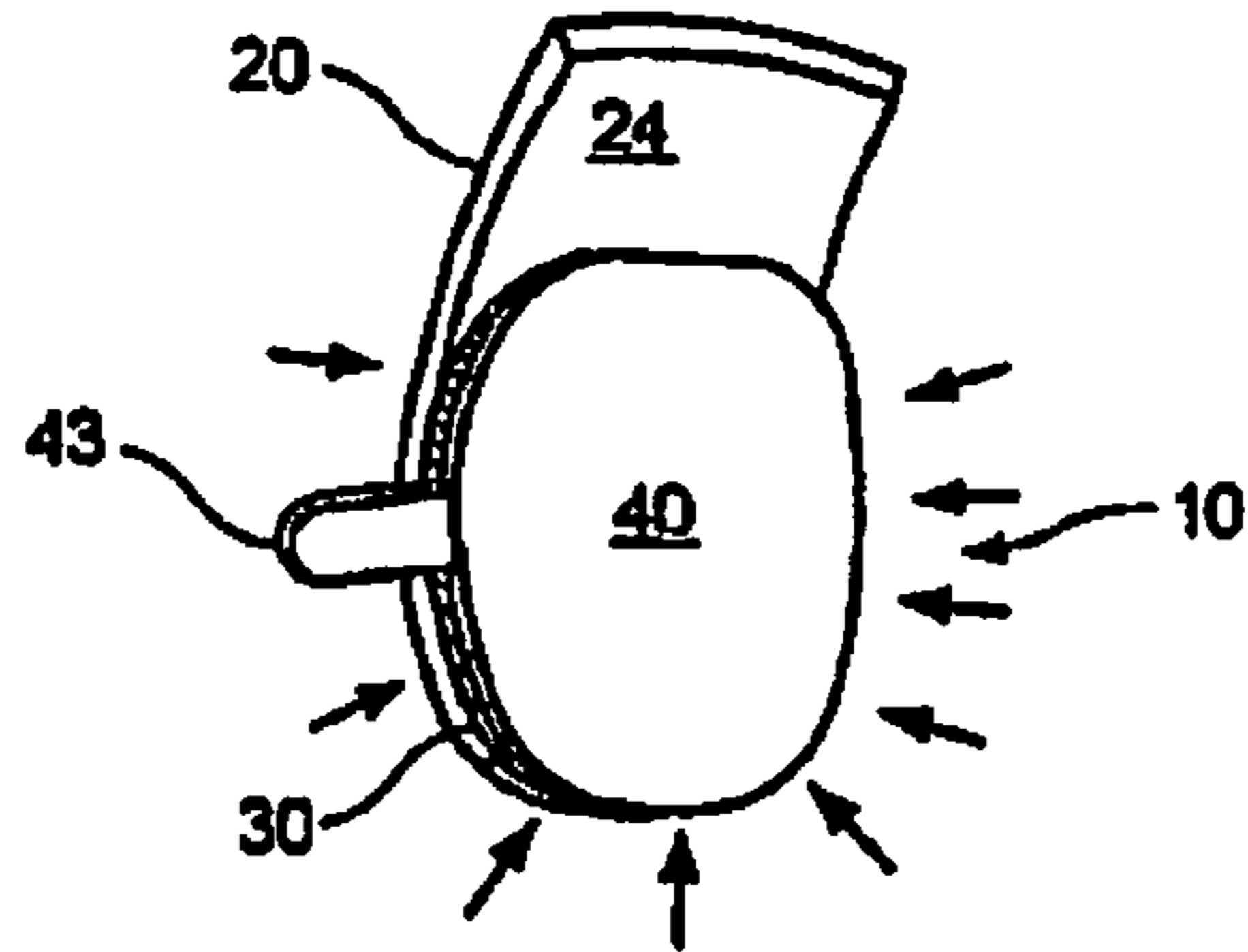


FIG. 5

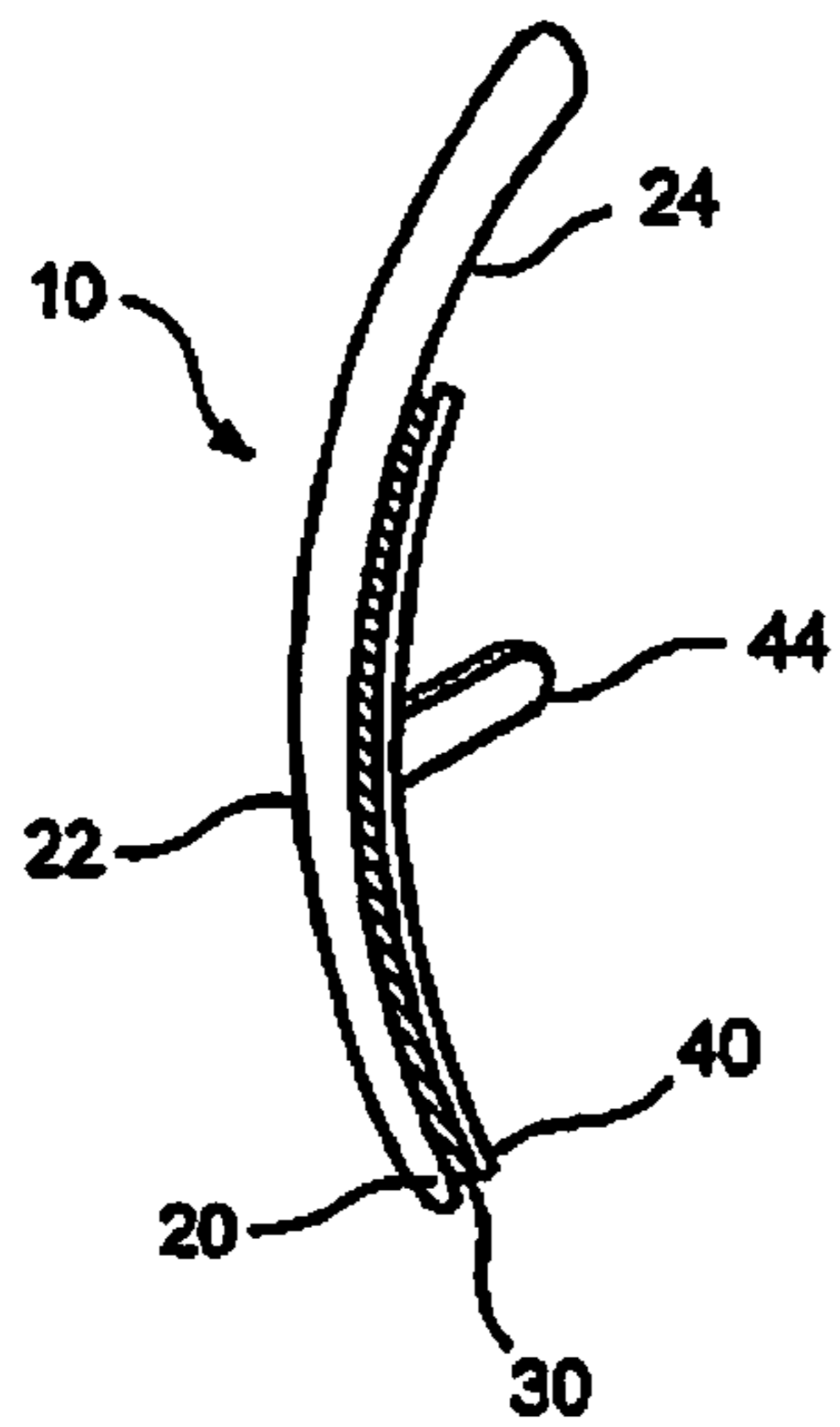


FIG. 6

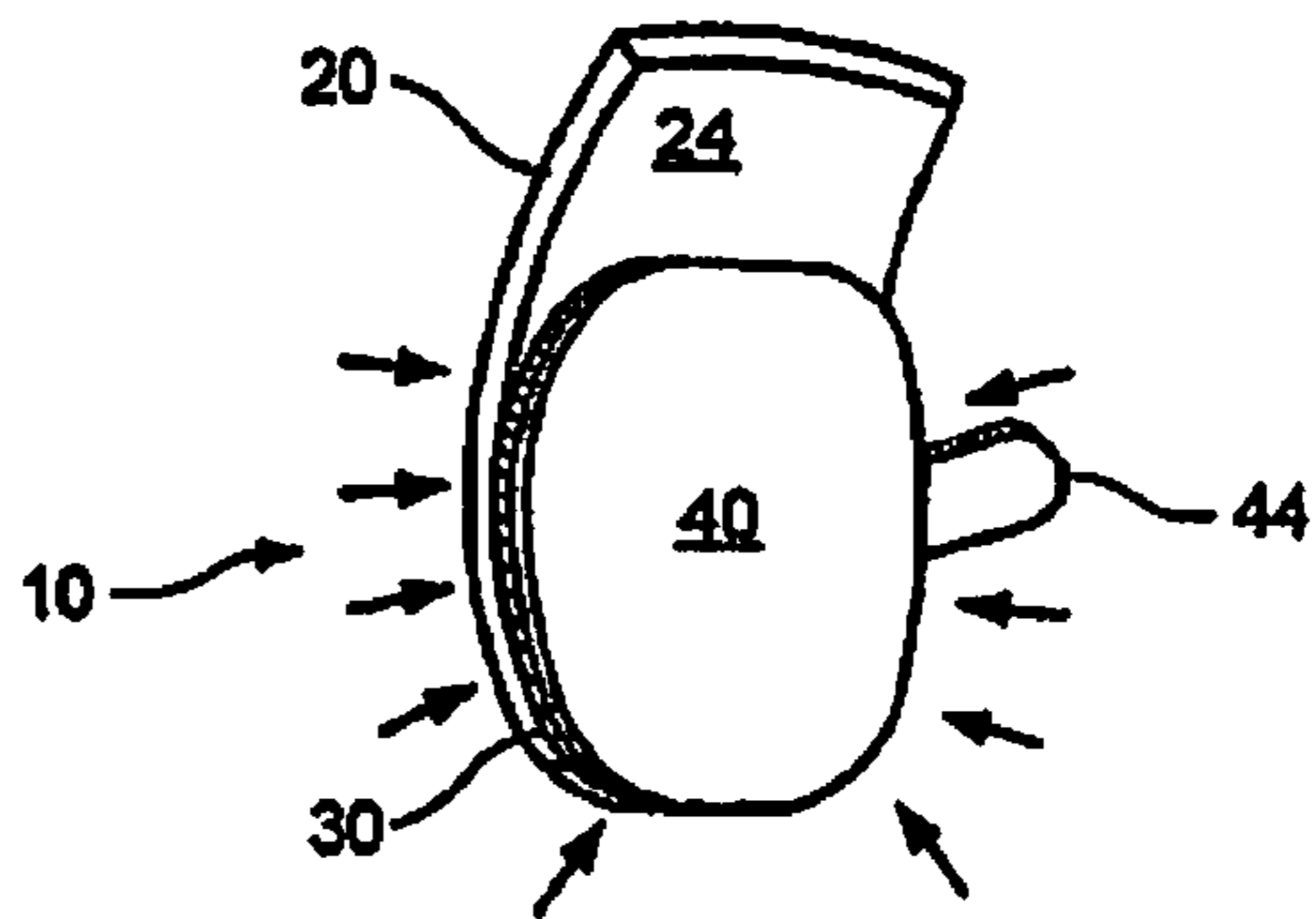


FIG. 7

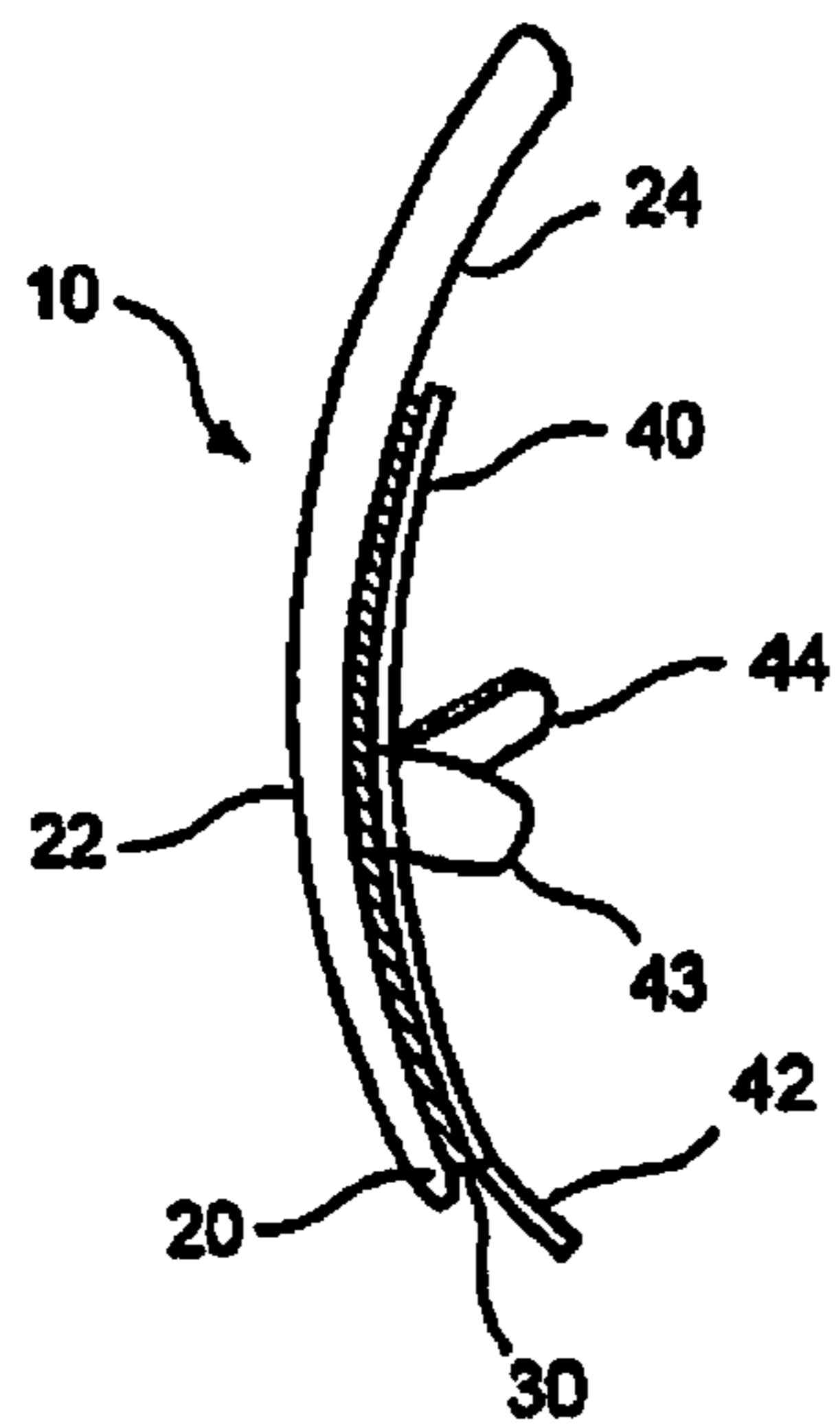


FIG. 8

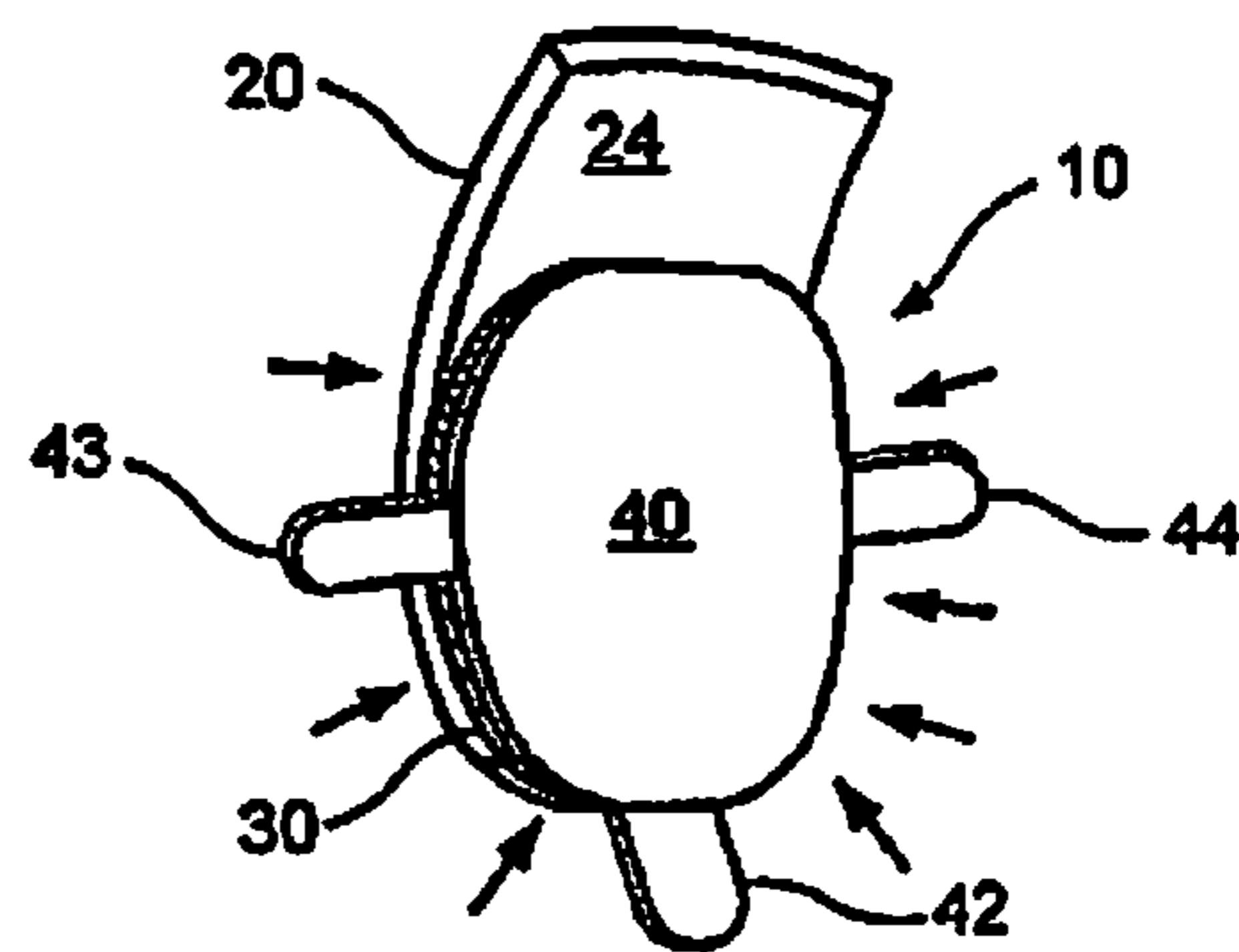


FIG. 9

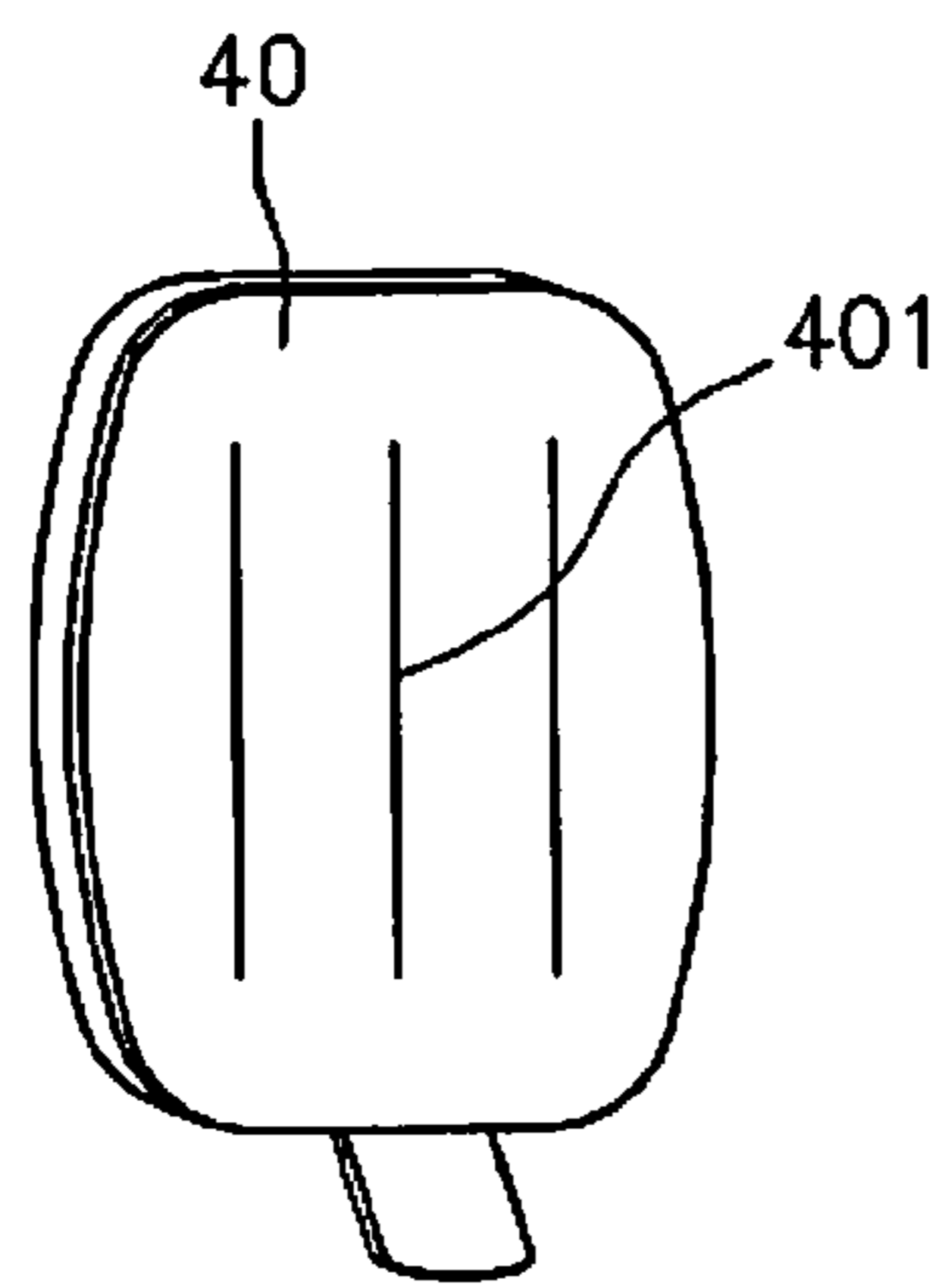


FIG. 10A

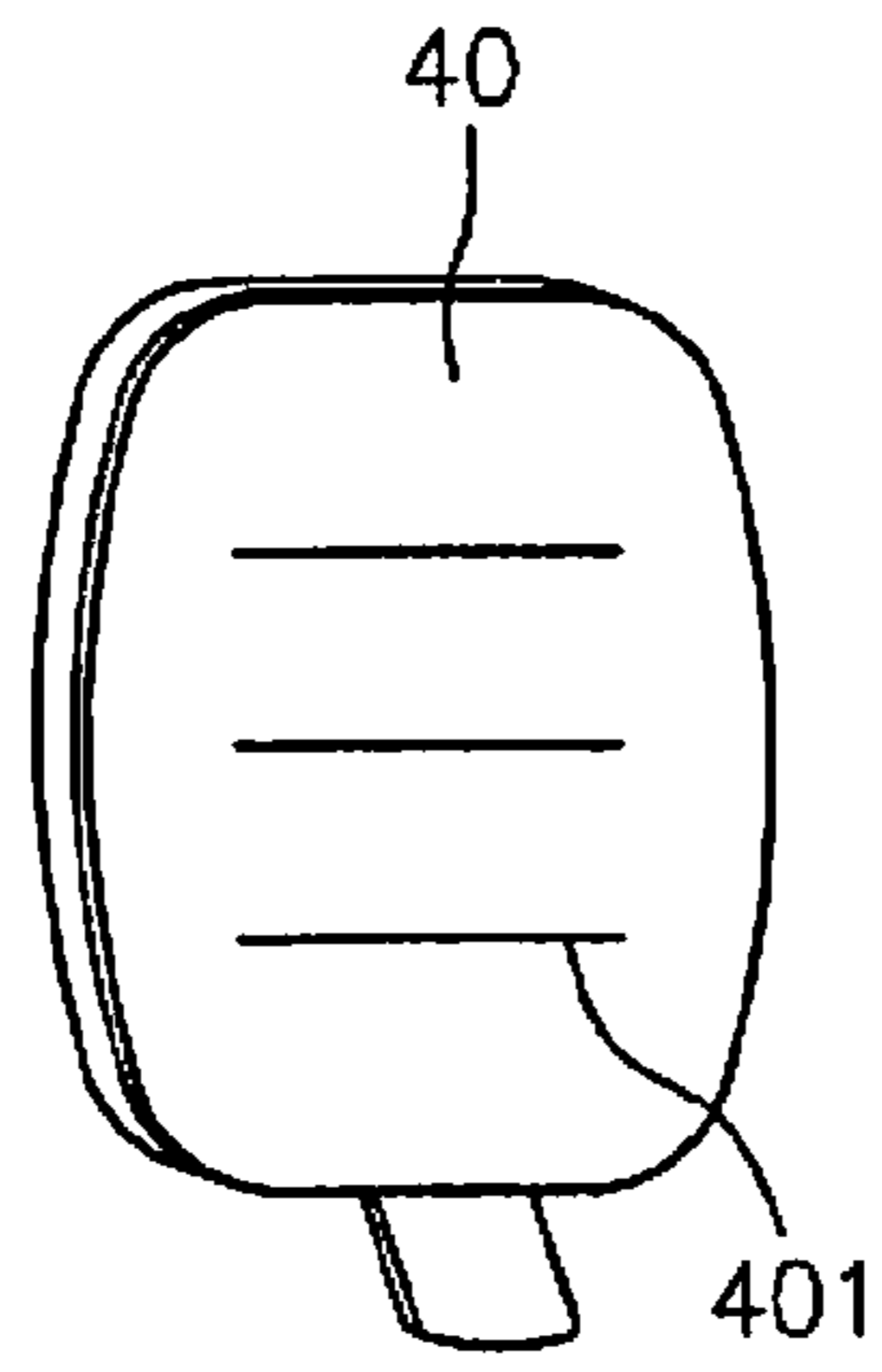


FIG. 10B

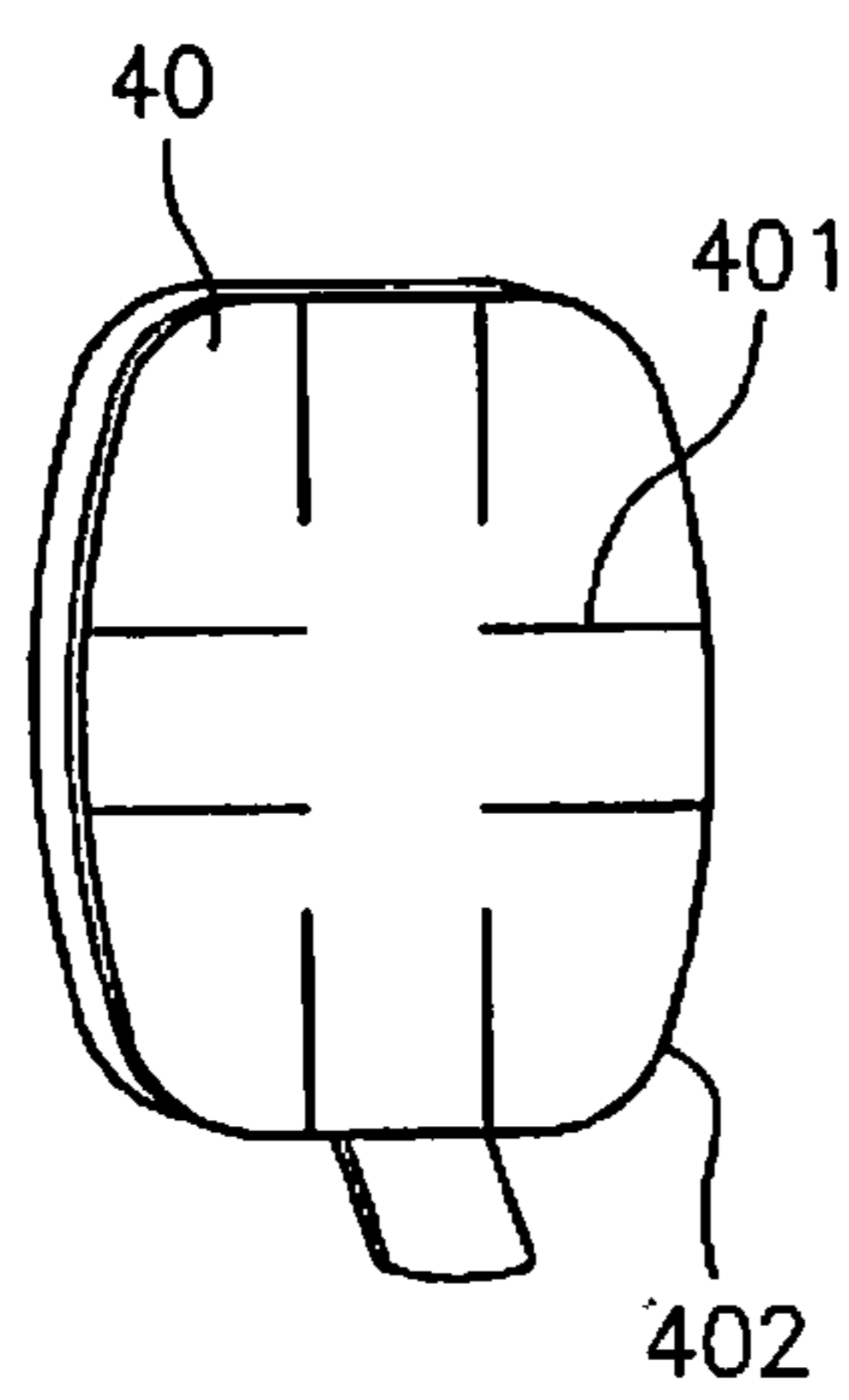


FIG. 10C

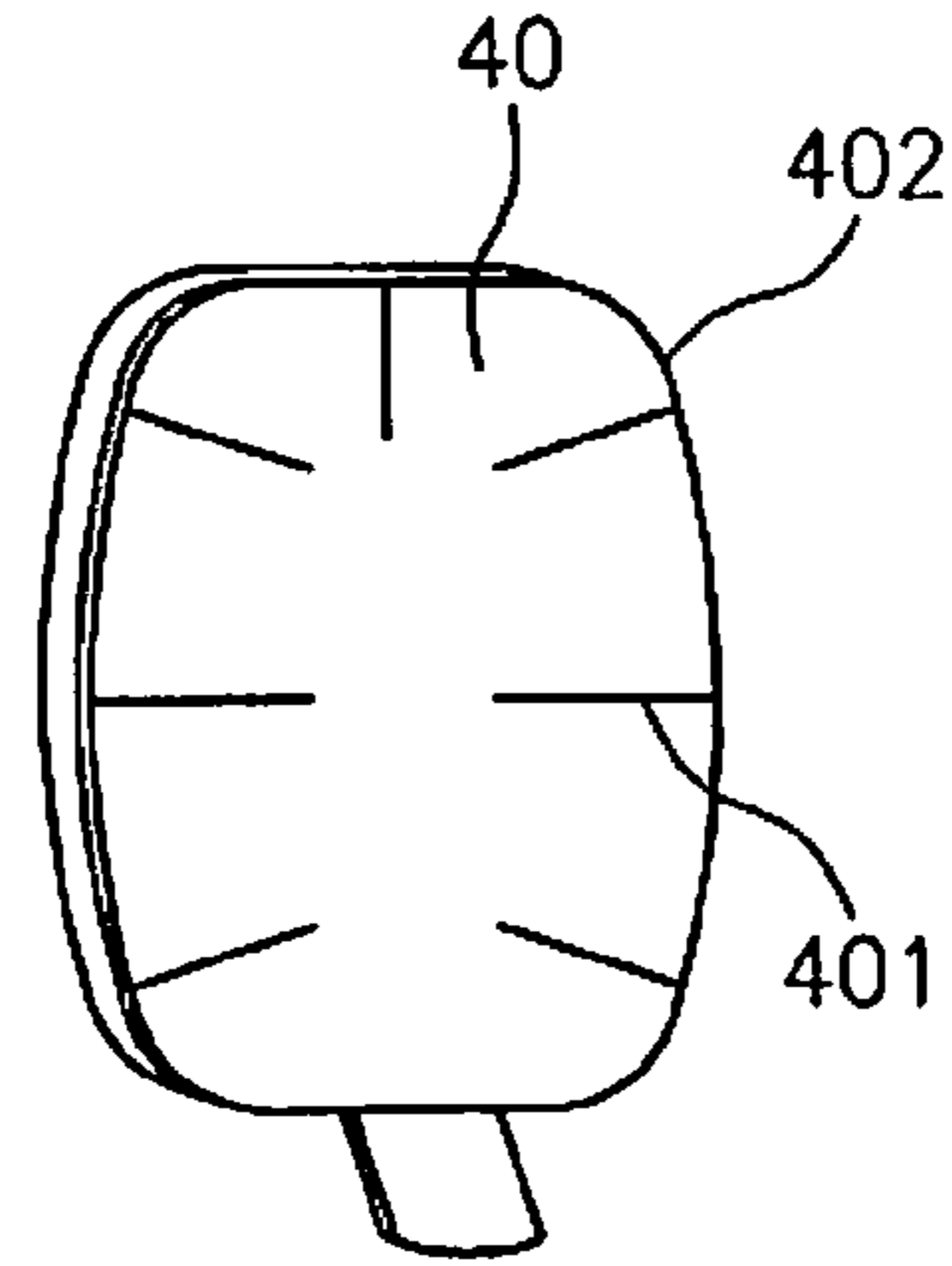


FIG. 10D

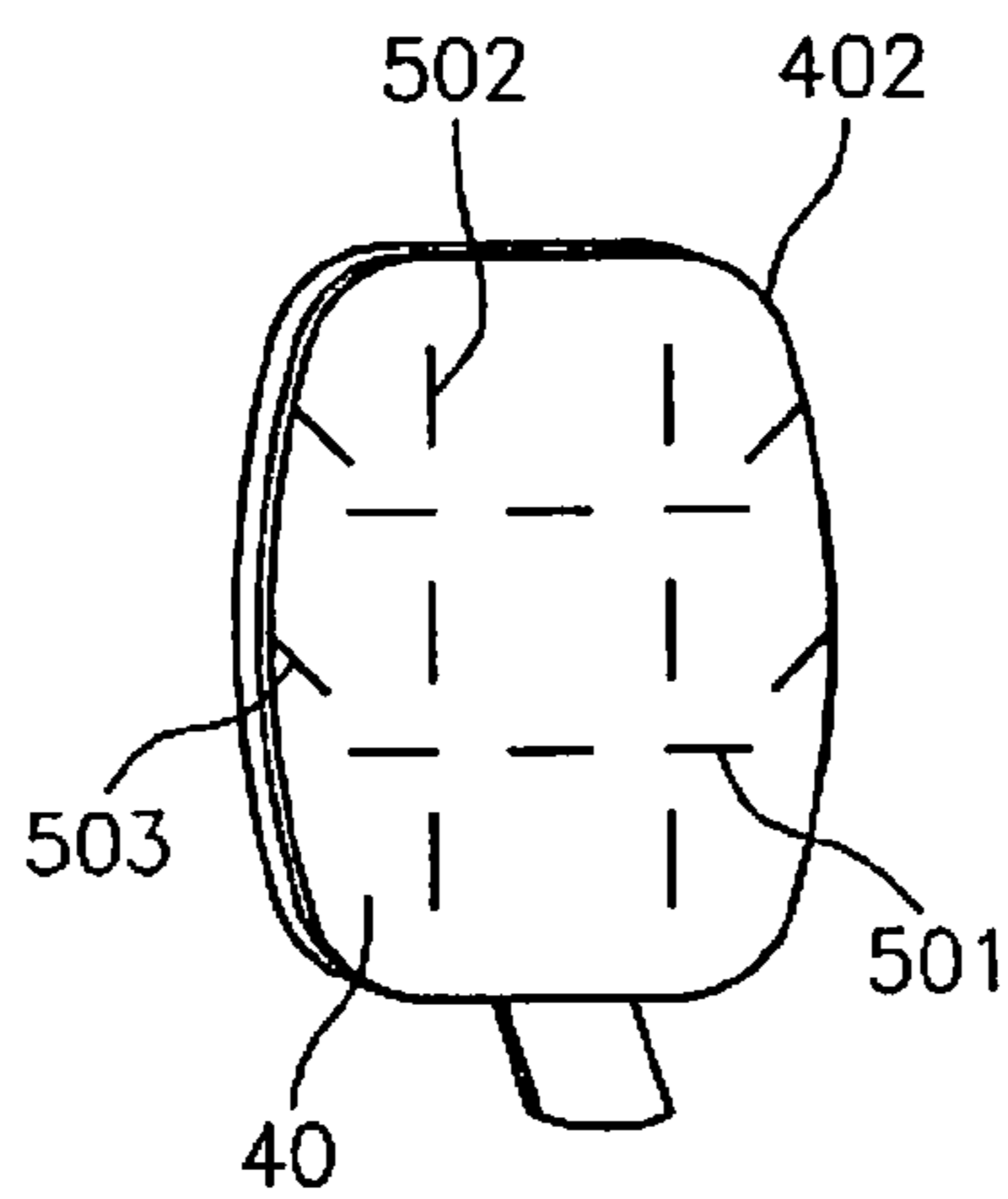
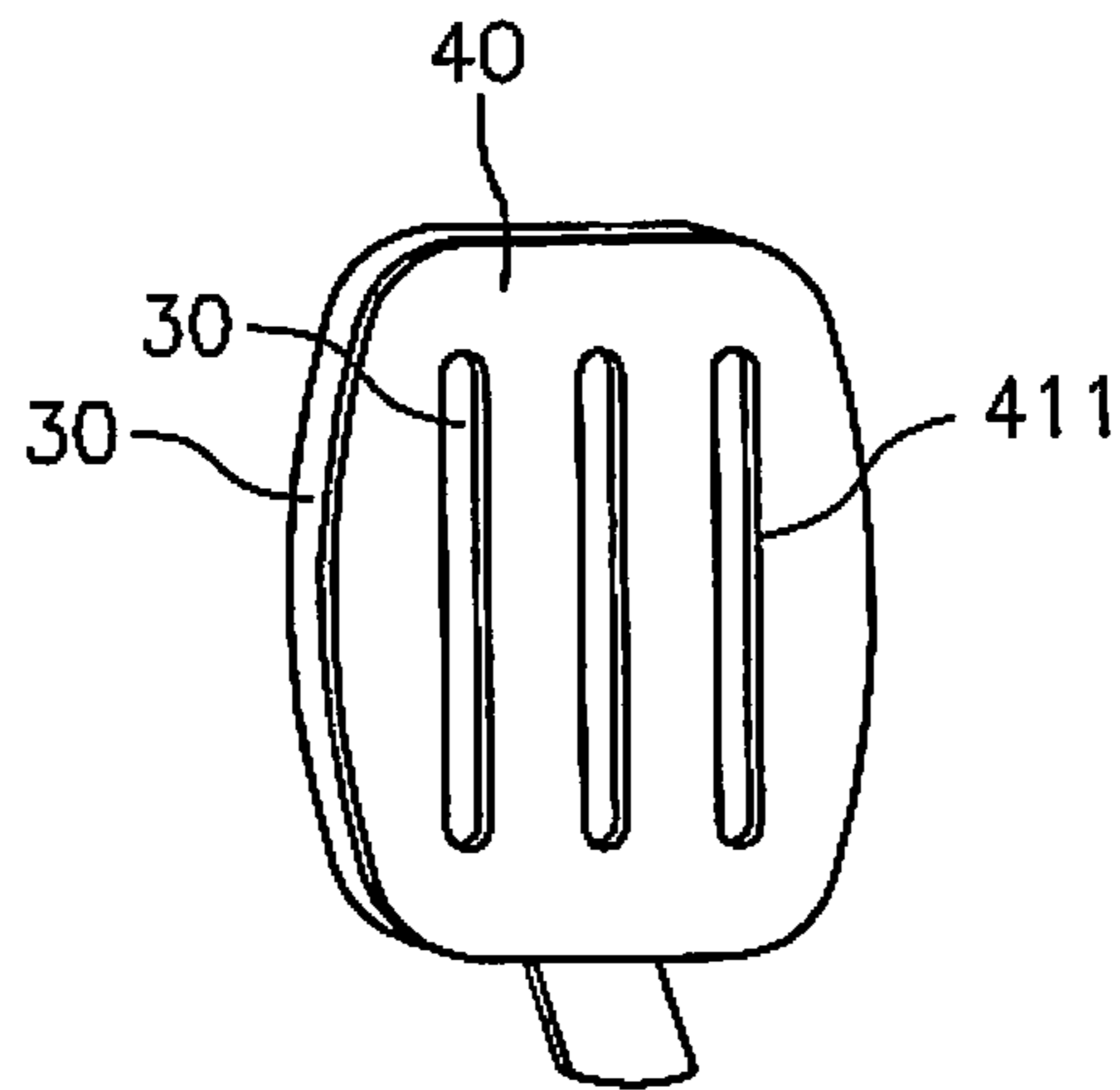
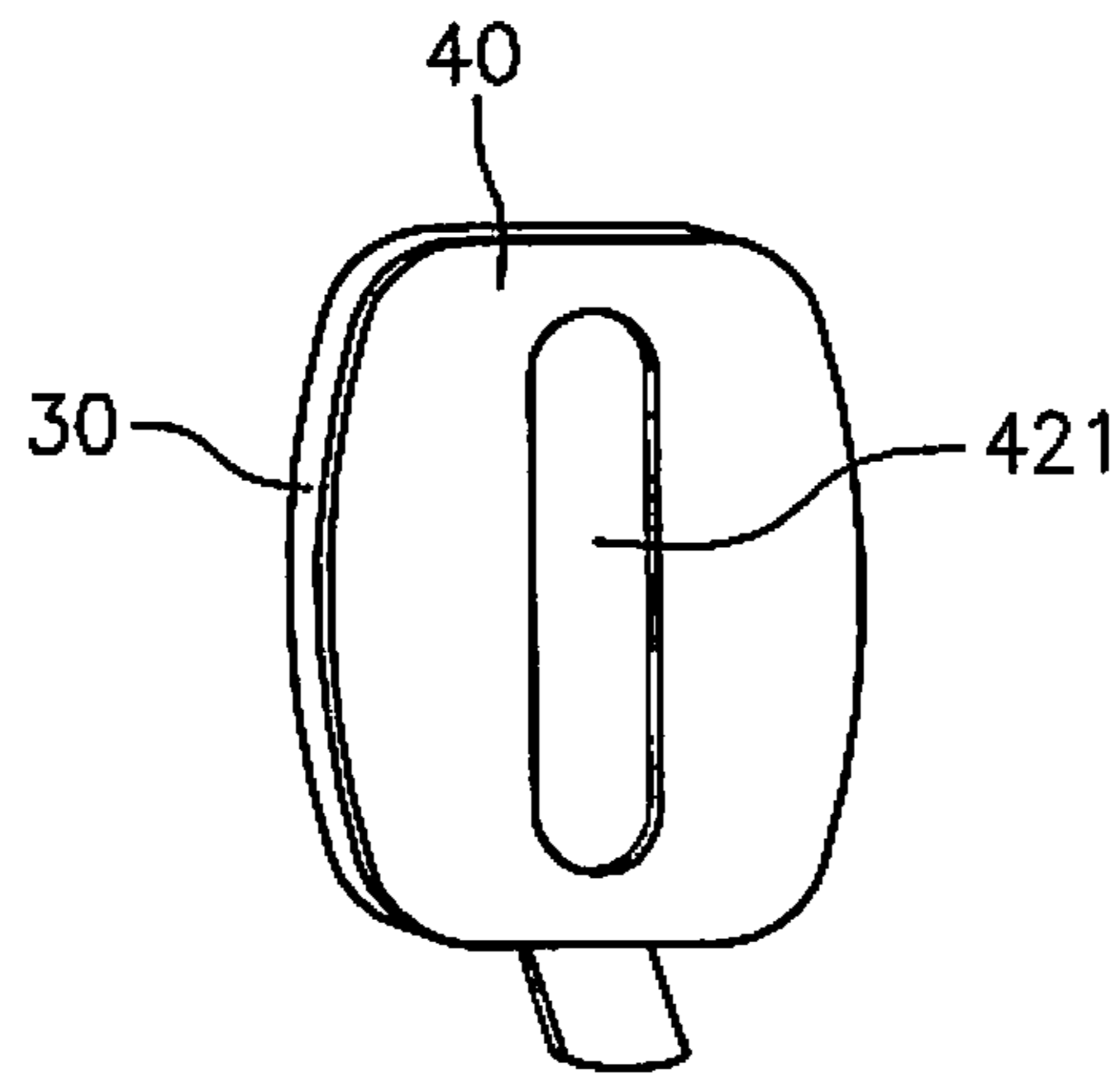


FIG. 10E



*FIG. 11*



*FIG. 12*



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## ARTIFICIAL NAIL OR TIP ARRANGEMENT AND METHOD OF MAKING SAME

### CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a Continuation-In-Part Application of application Ser. No. 12/632,980, filed Dec. 8, 2009, the contents of which are incorporated herein by reference.

### BACKGROUND

#### 1. Field of the Invention

The present invention relates generally to artificial nails (e.g., finger nails or toe nails), nail extensions, tips, etc., and more particularly, to a pre-taped artificial nail having an adhesive with a removable protective layer, and a method of making the same.

#### 2. Description of Related Art

Ornamental fingernail accessories made from thin, molded plastic members manufactured generally in the shape of a fingernail are commonly known in the art. (See, e.g. U.S. Pat. No. 6,394,100 issued to Chang). Typically, the user applies a small amount of a liquid bonding adhesive to the fingernail accessory or the natural nail and affixes the fingernail accessory to the nail. As an alternative, U.S. Pat. No. 4,745,934 issued to Mast et al., provides an adhesive press-on tab system for attaching artificial fingernails to the user's natural nails. The tabs are essentially double-sided adhesive tape with removable layers that are interposed between the artificial fingernail and the natural fingernail.

Attempts have been made to provide an ornamental fingernail having a pre-applied pressure sensitive layer with varying degrees of success. For example, U.S. Pat. No. 5,415,903 issued to Hoffman et al. describes a self-adhesive laminate having an adhesive composition made of an acrylic copolymer requiring acrylic acid and titanium chelate ester. U.S. Pat. No. 6,042,679 issued to Holt et al. describes that an acrylic pressure sensitive adhesive known in the art can be used in a method for treating damaged fingernails. U.S. Pat. No. 5,044,384 issued to Hokama et al. describes that a pressure-sensitive adhesive known in the art can be used in a method for accomplishing a rapid and durable manicure. U.S. Pat. No. 4,860,774 issued to Becker describes that a commercially available pressure-sensitive adhesive can be used in a method for fingernail reinforcement.

U.S. Pat. No. 7,185,660 to Han describes an artificial fingernail and method of making an artificial fingernail in which the artificial fingernail is pre-taped with an adhesive layer covered by a removable layer during the manufacturing process. The removable layer covers the adhesive layer and is removable to expose the adhesive layer for application to the natural fingernail.

However, during manufacture, when the adhesive layer is pushed to contact and adhere to a concave lower surface of the artificial fingernail, a crease or wrinkle can form in the removable layer resulting in a less desirable product with compromised adhesive properties.

### SUMMARY OF INVENTION

The present invention has been made to address at least the above problems and/or disadvantages and to provide at least the advantages described below. Accordingly, an aspect of the present invention provides an artificial nail or tip arrangement having slits cut from a removable layer covering an adhesive layer.

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According to one aspect of the present invention, an artificial nail or tip arrangement is provided. The artificial nail or tip arrangement includes at least one body having a concave lower surface with a shape corresponding to a shape of at least one portion of a natural nail. The artificial nail or tip arrangement also includes an adhesive layer having a first surface and an opposing second surface. The first surface adheres to at least one portion of the concave lower surface of the at least one body and the second surface is provided to adhere to the at least one portion of the natural nail when applied thereto. The artificial nail or tip arrangement further includes a removable layer that covers at least one portion of the second surface of the adhesive layer, and which is removable to expose the at least one portion of the second surface of the adhesive layer for application to the at least one portion of the natural nail. The removable layer comprises one or more slits so that a surface of the removable layer remains smooth after adherence of the first surface of the adhesive layer with the concave lower surface of the at least one body.

According to another aspect of the present invention a method of making an artificial nail or a nail tip is provided. At least one body having a shape corresponding to at least one portion of the artificial nail or the nail tip, a convex surface and a concave surface is formed in a well portion of a mold part. A composite strip is disposed over the at least one body. The composite strip comprises a removable layer and an adhesive layer having a first surface and second surface. The first surface faces the concave surface of the at least one body, and the second surface is covered by the removable layer. One or more slits are cut into the removable layer using a die. A pressure is applied to the composite strip so as to adhere at least one portion of the adhesive layer to the concave surface of the at least one body. The application of the pressure to the portion of the composite strip which adhered to the concave surface of the at least one body is reduced or eliminated. A surface of the removable layer remains smooth after adherence of the composite strip to the concave surface of the at least one body due to the one or more slits.

### BRIEF DESCRIPTION OF THE DRAWINGS

The above and other aspects, features and advantages of the present invention will be more apparent from the following description when taken in conjunction with the accompanying drawings, in which:

FIG. 1 illustrates a first embodiment of an artificial fingernail of the present invention;

FIG. 2 is a bottom perspective view according to the first embodiment of the present invention in FIG. 1;

FIG. 3 is a side view of a mold for processing according to an embodiment of the present invention;

FIG. 4 is a side view of a second embodiment of the artificial fingernail of the present invention;

FIG. 5 is a bottom perspective view of the second embodiment of the present invention in FIG. 4;

FIG. 6 is a side view of a third embodiment of the artificial fingernail of the present invention;

FIG. 7 is a bottom perspective view of the third embodiment of the present invention in FIG. 6;

FIG. 8 is a side view of a fourth embodiment of the artificial fingernail of the present invention;

FIG. 9 is a bottom perspective view of the fourth embodiment of the present invention in FIG. 8;

FIG. 10A-10E illustrates an embodiment of the artificial nail of the present invention including one or more slits;

FIG. 11 illustrates an embodiment of the present invention including one or more slots; and

FIG. 12 illustrates a embodiment of the present invention including one or more channels.

#### DETAILED DESCRIPTION OF EMBODIMENTS OF THE PRESENT INVENTION

Embodiments of the present invention are described in detail with reference to the accompanying drawings. The same or similar components may be designated by the same or similar reference numerals although they are illustrated in different drawings. Detailed descriptions of constructions or processes known in the art may be omitted to avoid obscuring the subject matter of the present invention.

FIGS. 1 and 2 show an artificial fingernail 10 according to a first embodiment of the present invention. The term "artificial fingernail" can include, but is not limited to, a full-cover nail intended to be applied over the entire surface of a user's natural nail (e.g., a finger nail or a toe nail), a nail extension or "nail tip" intended to be applied to at least one portion of the user's natural nail, and the like.

As shown in FIGS. 1 and 2, the artificial nail 10 may include a polymeric body 20 corresponding to a shape of at least one portion of a natural fingernail. The polymeric body 20 can be designed as a full-cover nail, a partial artificial nail portion and/or an artificial nail tip. The polymeric body 20 can be made from a composition of Acrylonitrile-Butadiene-Styrene (ABS) plastic and a polycarbonate. Further, the polymeric body 20 can also be made from any plastic-like material commonly employed in the manufacture of artificial nails, such as ABS plastic, nylon, tenite acetate, vinyl acetate, polycarbonates, polyvinyl chloride, etc.

Examples of suitable hard materials for the polymeric body 20 can include Styrolux® 684D (SBC), a styrene-butadiene block copolymer available from BASF Corporation; Cyro® R40 (acrylic base), an acrylic-based multipolymer available from Cyro Industries of Rockaway, N.J.; Lexane KR01 (PC) (trade name), a polycarbonate available from GE Plastics; K-resin® (SBC), a styrene-butadiene copolymer available from Chevron Phillips Chemical Company; TP-UXS (MMBS) (trade name), a methyl methacrylate butadiene styrene terpolymer available from DENKA of Tokyo, Japan; Starex® 5010 (ABS), an acrylonitrile butadiene styrene available from Samsung Cheil Industries; Zylar® 220 (SMMC) and Nas®30, styrene methyl methacrylate copolymers available from Nova Chemicals; and Toyalac 920 (Clear ABS), an acrylonitrile butadiene styrene available from Toray Resin Company.

The polymeric body 20 preferably has a thickness of between about 0.35 and 0.65 mm, but the thickness may vary according to the application. The polymeric body 20 can include an upper surface 22, which is provided to be away from a surface of the user's natural nail, and a lower surface 24, which is structured to face a top surface of the user's natural nail. An adhesive layer 30 can be secured to at least one portion of the lower surface 24, preferably a proximal portion of lower surface 24 which is intended to be closer to a cuticle of the user's natural nail. The adhesive layer 30 is configured to adhere to an upper surface of the user's natural nail when applied thereto. The adhesive layer 30 can include, e.g., a copolymer of acrylic ester and vinyl acetate formed from an aqueous acrylic copolymer emulsion that has been dried on a carrier film.

A removable layer 40 can be provided on, and cover, the adhesive layer 30. The removable layer 40 can be removed from the adhesive layer 30 to expose adhesive layer 30 for application to the user's natural fingernail. In particular, according to the first embodiment of the present invention, the

removable layer 40 includes a tab 42 for facilitating removal of the layer 40 from the adhesive layer 30 extending outwardly beyond the periphery of the polymeric body 20. According to this embodiment and as shown in FIGS. 1 and 2, the tab 42 can be integrally and/or detachably connected to a front edge of the layer 40, e.g., at a front edge of the polymeric body 20 that is provided for application at or close to a cuticle of the user's natural nail.

Due to the positioning of the tab 42 beyond the periphery of the polymeric body 20 and/or the artificial nail 10, it is easier and quicker for the user to remove the removable layer 40 from the adhesive layer 30 that is provided on the polymeric body 20. This is because there is a structure to allow the user to grasp the tab 42 of the removable layer 40 to remove it from the adhesive layer 30. In addition, it is possible to bend the tab 42 to be initially situated under the lower surface 24 when it is packaged. This configuration (i.e., bending) of the tab 42 can facilitate an easier packaging of the artificial nail 10 (or tip/extension), and possibly reduce and/or prevent damage or unintended removal of the tab 42. When the user or anyone else is prepared to remove the removable layer 40, the tab 42 can be unbent such that it extends beyond the periphery of the polymeric body 20.

The adhesive layer 30 can include a film including a pressure sensitive adhesive, and the removable layer 40 can include a silicon treated paper or plastic film. According to one embodiment of the present invention, the adhesive layer 30 is preferably an unsupported laminating film having a thickness approximately between 0.100 and 0.150 mm. The adhesive layer 30 may be a vinyl film coated on each side with an adhesive. For example, the removable layer 40 can be made from plastic, paper or another material, and have a surface that is in contact with the adhesive layer 30 that is configured for easy removal thereof when pulled by the user.

In an embodiment of the present invention, a method for making an artificial fingernail can be provided. For example, at least one polymeric body having a shape corresponding with at least a portion of a natural nail can be formed. In FIG. 3, an injection mold is illustrated which includes a mold part 50 for forming the polymeric body, i.e., four polymeric bodies 20a, 20b, 20c, 20d as shown. The mold part 50 includes at least one and preferably several cavities or well portions, i.e., four well portions 52a, 52b, 52c, 52d, as shown in FIG. 3. Each well portion 52a, 52b, 52c, 52d can have the shape, size and thickness of the respective polymeric bodies 20a, 20b, 20c, 20d. Each polymeric body 20a, 20b, 20c, 20d formed in mold part 50 has a convex surface 22a, 22b, 22c, 22d and a concave surface 24a, 24b, 24c, 24d.

After forming polymeric bodies 20a, 20b, 20c, 20d, a composite strip 300 is disposed over the polymeric bodies. The composite strip 300 can include the adhesive layer 30 having first and second layer surfaces 32, 34, respectively, and the removable layer 40. For example, the composite strip 300 can include a pressure sensitive adhesive film covered on one side with a silicon treated paper or plastic film. The first layer surface 32 faces the concave surfaces 24a, 24b, 24c, 24d of the polymeric bodies 20a, 20b, 20c, 20d. The second layer surface 34 can be covered by the removable layer 40.

According to an embodiment of the present invention, gas pressure and/or air pressure can then be directed toward the mold part 50, and specifically toward the second layer surface 34. Thus, in such manner, the first layer surface 32 of the adhesive layer 30 is pushed to contact and adhere to the concave surfaces 24a, 24b, 24c, 24d of the polymeric bodies 20a, 20b, 20c, 20d. According to another embodiment of the present invention, it is possible to utilize one or more robotic arms to press the composite strip 300 on top of the polymeric

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bodies **20a**, **20b**, **20c**, **20d** so that the composite strip **300** contacts these polymeric bodies **20a**, **20b**, **20c**, **20d**. Robotic arms can be controlled via a computer arrangement (e.g., a microprocessor), which can implement and/or execute software residing on a computer-accessible medium (e.g., hard disk, floppy drive, memory stick, RAM, ROM, etc.) to press the composite strip **300** on top of the polymeric bodies **20a**, **20b**, **20c**, **20d**.

A second embodiment of the artificial fingernail **10** is shown in FIGS. **4** and **5**. All of the elements of the second embodiment illustrated in FIGS. **4** and **5** that are labeled in the same manner as those provided in the first embodiment illustrated in FIGS. **1** and **2** are the same or similar elements. The difference between the first and second embodiments is that a tab **43** is provided at a side of the polymeric body **20** and/or the artificial nail **10**. In particular, according to the second embodiment of the present invention, the tab **43**, which is provided for facilitating removal of the removable layer **40** from the adhesive layer **30**, extends outwardly beyond the periphery of the polymeric body **20**. Particularly, the tab **43** can be integrally and/or detachably connected to a right side edge of the removable layer **40**, e.g., at a right side edge of the polymeric body **20**.

A third embodiment of the artificial fingernail **10** is shown in FIGS. **6** and **7**. All of the elements of the third embodiment provided in FIGS. **6** and **7** that are labeled in the same manner as those provided in the second embodiment illustrated in FIGS. **4** and **5** are the same or similar elements. The difference between the second and third embodiments is that a tab **44** is provided at a side of the polymeric body **20** and/or the artificial nail **10** that is opposite the side at which tab **43** was provided. In particular, the tab **44** can be integrally and/or detachably connected to a left side edge of the removable layer **40**, e.g., at a left side edge of the polymeric body **20**.

A fourth embodiment of the artificial fingernail **10** is shown in FIGS. **8** and **9**. All of the elements of the fourth embodiment provided in FIGS. **6** and **7** that are labeled in the same manner as those provided in the first, second and third embodiments illustrated in FIGS. **1-7** are the same or similar elements. The difference between the fourth embodiment and the first, second and third embodiments is that all three tabs **42**, **43**, **44** are provided at the respective sides of the polymeric body **20** and/or the artificial nail **10**. Thus, the user of the artificial nail **10** can pull any one or more of the three tabs **42**, **43**, **44** to remove the removable layer **40** from the adhesive layer **30**, so that the adhesive layer can be applied to the top surface of at least one portion of the user's natural nail.

Referring again to FIG. **3**, when the gas pressure and/or air pressure is directed toward the mold part **50**, specifically toward the second layer surface **34**, and the first layer surface **32** of the adhesive layer **30** is pushed to contact and adhere to the concave surfaces **24a**, **24b**, **24c**, **24d** of the polymeric bodies **20a**, **20b**, **20c**, **20d**, a crease or wrinkle can form in the removable layer **40**.

Accordingly, an embodiment of the artificial nail of the present invention includes the removable layer **40** having one or more slits **401**. As illustrated in FIG. **10**, the slits **401** can be provided in (a) a vertical orientation; (b) a horizontal orientation; (c) a mixed horizontal and vertical orientation with the slits **401** extending to an edge **402** of the removable layer **40**; (d) a radial orientation with the slits **401** extending to the edge **402** of the removable layer **40**; and (e) a mixed horizontal, vertical and radial orientation.

The radial orientation of the slits **401** is preferably oriented along lines where the concave surfaces **24a**, **24b**, **24c**, **24d** exhibit the highest concavity, and is not limited to lines directed towards the center of the removable layer **40**. Thus,

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when the adhesive layer **30** is pushed to contact and adhere to the concave surfaces **24a**, **24b**, **24c**, **24d** of the polymeric bodies **20a**, **20b**, **20c**, **20d**, the removable layer **40** will no longer crease or wrinkle due to the space and flexibility provided by the slits **401**.

In an embodiment of the present invention shown in FIG. **10(e)**, the combination orientation includes two sets of non-continuous horizontal slits **501**, two sets of non-continuous vertical slits **502**, and one or more radial slits **503** extending from the edge **402** of the removable layer **40** at an approximate 45-degree angle.

A method for manufacturing the layer **40** having the slits **401** (or **501**, **502** and **503**) preferably occurs through a die cutting process. A die is made according to one of the orientations described above, i.e. with slits **401** provided in a vertical, horizontal, mixed, radial, or combination orientation. Specifically, the die is shaped according to the number and orientations of the slits **401** to be cut into the removable layer **40**. Prior to, or simultaneous with, the application of pressure to the composite strip **300**, the slits **401** are cut in the removable layer **40** using the shaped die. As described below with respect to FIGS. **11** and **12**, the slits may comprise one or more slots **411** or channels **421**, which are formed by cutting a wider gap in the removable layer **40** than for the slits **401**. The method for making the artificial fingernails then proceeds as described above. As a result of the die cutting process on the removable layer, slits, slots or channels may also be formed in the adhesive layer.

A further embodiment of the present invention is illustrated in FIG. **11** and includes the removable layer **40** having one or more slots **411**, the slots **411** being wider than the slits **401**. As described above for the one or more slits **401**, the slots **411** can be provided in (a) a vertical orientation, (b) a horizontal orientation, (c) a mixed horizontal and vertical orientation with the slots **411** extending to an edge **402** of the removable layer **40**, (d) a radial orientation with the slots **411** extending to the edge **402** of the removable layer **40** and similar to the combination orientation shown in FIG. **10(e)**.

The radial orientation of the slots **411** is preferably oriented along lines where the concave surfaces **24a**, **24b**, **24c**, **24d** exhibit the highest concavity, and is not limited to lines directed towards the center of the removable layer **40**. Thus, when the adhesive layer **30** is pushed to contact and adhere to the concave surfaces **24a**, **24b**, **24c**, **24d** of the polymeric bodies **20a**, **20b**, **20c**, **20d**, the removable layer **40** will no longer crease or wrinkle due to the space and flexibility provided by the slots **411**.

FIG. **12** illustrates an additional preferred embodiment of the present invention and includes the removable layer **40** having one or more channels **421**, the channels **421** being wider than the slots **411** and including an opening in the adhesive layer **30** and the removable layer **40**. Thus, within the channels **421**, the lower surface **24** of the polymeric body **20** is exposed to the user's environment.

As described above for the one or more slits **401**, the channels **421** can be provided in (a) a vertical orientation, (b) a horizontal orientation, (c) a mixed horizontal and vertical orientation with the channels **421** extending to an edge **402** of the removable layer **40**, (d) a radial orientation with the channels **421** extending to the edge **402** of the removable layer **40** and similar to the combination orientation shown in FIG. **10(e)**.

The radial orientation of the channels **421** is preferably oriented along lines where the concave surfaces **24a**, **24b**, **24c**, **24d** exhibit the highest concavity, and is not limited to lines directed towards the center of the removable layer **40**. Thus, when the adhesive layer **30** is pushed to contact and

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adhere to the concave surfaces **24a**, **24b**, **24c**, **24d** of the polymeric bodies **20a**, **20b**, **20c**, **20d**, the removable layer **40** will no longer crease or wrinkle due to the space and flexibility provided by the channels **421**.

While the invention has been shown and described with reference to certain embodiments thereof, it will be understood by those skilled in the art that various changes in form and details may be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

What is claimed is:

**1.** An artificial nail or tip arrangement comprising:

a body having a concave lower surface with a shape corresponding to a shape of at least one portion of a natural nail;

an adhesive layer having a first surface and an opposing second surface, wherein the first surface adheres to at least one portion of the concave lower surface of the body and the second surface is provided to adhere to the at least one portion of the natural nail when applied thereto; and

a removable layer that covers at least one portion of the second surface of the adhesive layer, and which is removable to expose the at least one portion of the second surface of the adhesive layer for application to the at least one portion of the natural nail, the removable layer

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comprising a plurality of slits formed therethrough and disposed along a planar surface of the removable layer, at least one of the plurality of slits not extending to a peripheral edge of the removable layer and being separated from an adjacent, collinear slit by an uncut region of the removable layer,

wherein the plurality of slits are configured to facilitate conformance of the planar surface of the removable layer to the concave lower surface of the body without wrinkling the removable layer after adherence of the first surface of the adhesive layer with the concave lower surface of the body.

**2.** The artificial nail or tip arrangement according to claim **1**, wherein the at least one of the plurality of slits is oriented vertically along a length of the body.

**3.** The artificial nail or tip arrangement according to claim **1**, wherein the at least one of the plurality of slits is oriented horizontally across a width of the body.

**4.** The artificial nail or tip arrangement according to claim **1**, wherein the plurality of slits extend vertically along a length of the body and horizontally across a width of the body.

**5.** The artificial nail or tip arrangement according to claim **1**, further comprising one or more slits that extend radially through an edge of the removable layer.

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